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REMARKS

Claims 1-20 are pending in the application. In the May 19th Office action, claims 1, 8-12, 14-17, and 19 were rejected, and claims 2-7, 13, 18, and 20 were objected to. In response, applicants cancelled claim 16 to eliminate an objection thereto, and traverse the rejection of claims 1, 8-12, 14-17, and 19. Further examination and reconsideration respectfully are requested.

Explanation of the Amendment

Claim 16 was objected to as being of improper dependent form for failing to further limit the subject matter of a previous claim. Being a redundant limitation, claim 16 has been canceled.

Applicants Traverse the Section 102 Rejection of Claims 1, 9-12, 14-17 and 19 over Molitor et al.

Claims 1, 9-12, 14-17 and 19 have been rejected under 35 USC § 102 as being anticipated by US Patent No. 5,089,727 issued to Molitor et al. The rejection is traversed.

The Molitor patent discloses a modulator circuit that includes a MOSFET 62 in series with capacitor 78 and laser diode 32. The circuit components associated with the MOSFET 62 are designed to minimize the effect of the gate capacitance of the MOSFET 62 (see Molitor Patent, col. 4, lines 35-37) and improve its switching characteristics; specifically, "capacitor 78 is discharged through laser diode 32 by the low impedance of the drain-to-source path of MOSFET 62." Molitor Patent, col. 4, lines 22-24. Since the MOSFET 62 and associated circuitry is in effect a switch, Fig. 2 of Molitor may be simplified by representing the MOSFET circuit components as a switch, as shown in Fig. A. The

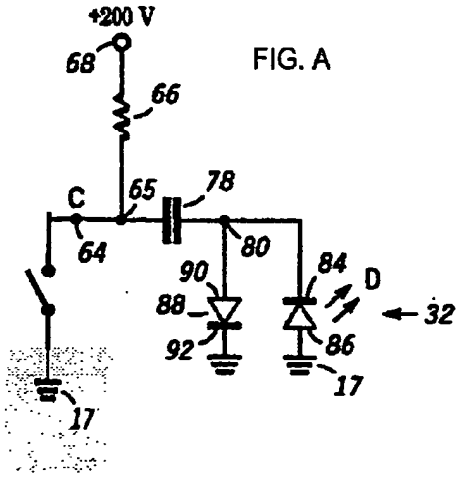

FIG. A

simplified figure eliminates aspects of Molitor et al. that do not correspond to the claimed invention, and facilitates comparison of those aspects of Molitor et al. which may be arguably prima facie relevant to the claimed invention. As the examiner will appreciate, Fig. A is nearly identical to prior art Fig. 1 of the present application.

Claim 1 includes the limitations of a laser diode controllably coupled to a first energy storage element and a second energy storage element through a switch-controlled circuit path, wherein the slow voltage discharge stage comprises the first energy storage element and the fast voltage discharge stage comprises the second energy storage element. Claim 14 includes the limitation of discharging a first energy storage element and a second energy storage element into a laser diode. Claim 19 includes the limitation of means for discharging a first energy storage element and a second energy storage element into a laser diode. Comparison of claims 1, 14 and 19 with Fig. A makes clear that all of these rejected independent claims include at least two energy storage elements which discharge through a laser diode or are coupled to a laser diode so as to be able to discharge through the laser diode. These claims are clearly distinguishable over Molitor et al., which discloses only one discharge stage as shown by Fig. A. The second capacitor 44 and associated circuitry of Molitor et al. relied on by the examiner for the slow discharge stage is not shown in simplified Fig. A because it is not part of the discharge circuit, and is not comparable to the claimed invention.

Following is a more detailed explanation of the technical basis for why the capacitor 44 is not part of the discharge circuit. Not all of the following information is strictly relevant to the anticipation rejection at issue, but it is useful for better appreciating how the teachings of Molitor et al. regarding capacitor 44 are not applicable to the present application under any legal principle.

Figure 2 of the Molitor Patent shows a capacitor 44 which supplies drive current to the gate of the FET 62 via a SCR 48. The examiner compares capacitor 44 with the

slow capacitor of some of the claims, which supplies the main drive current to the laser diode. However, these capacitors are not comparable, for the following reasons.

- In the Office action, page 3 second paragraph states "a laser diode (fig. 2 #86) coupled to the first energy storage element and to the second energy storage element through the switch controlled circuit path". Molitor does not disclose this. The capacitor 44 is not coupled to the laser diode since the current through capacitor 44 does not flow through the laser diode, but instead is used to energize the gate of the MOSFET 62.
- In the rejection of claims 14 and 16-17 in the 3rd paragraph on page 3, the statement that Molitor's patent discloses "discharging the first energy storage element and the second energy storage element into a laser diode (through #64 to diode #86), the discharge of the first energy storage element essentially furnishing a flattop current pulse to the laser diode (fig 3 #102 ....)" is incorrect. Since capacitor 44 does not discharge through the laser diode, it cannot do so in a manner that would create a flattop current pulse.
- The voltage in Molitor's patent for charging capacitor 44 is chosen based on drive requirements of the MOSFET 62, not based on the desired magnitude of the flattop current pulse and the total circuit resistance as for the slow capacitor voltage in some of the embodiments of the present invention. The value of the capacitor 44 itself is chosen based on the peak current requirement for driving the MOSFET 62 into an on state, not based on the desired droop or pulse shape in the laser diode current. Specifically, in column 4 line 39 Molitor states that "Capacitor 44 is selected to have a relatively large amount of capacitance to maximize the peak gate voltage of the waveform B to minimize the rise time of the pulse 110." In other words, the value of capacitor 44 is selected to prevent momentary voltage loss when peak current demands are imposed upon it when switching the MOSFET 62 into an on state. There would therefore be no suggestion or motivation (in a section 103 sense) to apply the teachings of Molitor, such as they are, to obtain the desired pulse shape in the laser diode current as in some of the embodiments of the present invention.

The examiner also compares capacitor 78 in Figure 2 of the Molitor patent with the functions of the fast capacitor. However, this comparison is inaccurate. Molitor states in column 4 line 34 "The laser diode pulse width is determined by the capacitance of capacitor 78." However, as described in the present application for some embodiments, the value of the fast capacitor determines the rise-time shape of the current through the laser diode.

Generally, since the independent claims are not anticipated, all claims dependent from the independent claims also are not anticipated because they include all of the limitations of the independent claims from which they depend, and are patentable for at least the same reasons as are the claims from which they depend. Moreover, while the dependent claims may recite additional limitations of independent patentable significance, discussion of their independent patentability is moot in view of the remarks made in connection with the independent claims.

Applicants Traverse the Section 102 Rejection of Claims 1 and 8-12 Over Clark et al.

Claims 1 and 8-12 have been rejected under 35 USC § 102 as being anticipated by US Patent No. 4,400,812 issued to Clark et al. The rejection is traversed.

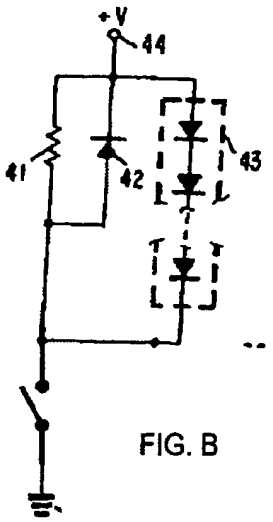

FIG. B

Fig. 1 of the Clark et al. patent, on which the examiner relies, discloses that current through the laser diode source 43 is controlled by a circuit (see col. 4, lines 35-55) that includes an amplifier stage (see col. 3, lines 26-38) connected via certain circuitry (see col. 3, lines 39-56) to an input stage (see col. 3, lines 57-62) which in turn is connected to a driver stage (see col. 3, line 63 – col. 4, line 10). In effect, the amplifier stage, input stage, and the transistors 38 and 39 of the driver stage can be thought of as a switch and represented as such to simplify Fig. 1. The simplified figure is shown in Fig. B, in

which aspects of Clark et al. that are not comparable with the claimed invention have been eliminated to facilitate comparison of those aspects of Clark et al. which may be arguably prima facie relevant to the claimed invention.

Claim 1 includes the limitations of a laser diode controllably coupled to a first energy storage element and a second energy storage element through a switch-controlled circuit path, wherein the slow voltage discharge stage comprises the first energy storage element and the fast voltage discharge stage comprises the second energy storage element. As Fig. B makes clear, the capacitors 21 and 30 relied on by the examiner in the rejection are not part of the discharge circuit, and are not comparable to the claimed invention.

Consider capacitor 21 in detail. Clark et al. refer to capacitor 21 as an "input" capacitor which is coupled to the gate electrode of VMOS transistor 24, see col. 3, lines 16-18. The capacitor 21 cannot be compared with claim 1 because it is not part of any discharge stage. In fact, capacitor 21 is nothing more that just a DC blocking capacitor within the amplifier stage. It does not store appreciable energy and does not discharge current through a laser diode.

Consider capacitor 30 in detail. Capacitor 30 is part of the circuitry that connects the amplifier stage to the driver stage. It merely acts to capacitively couple the drain of transistor 24 to the gate of transistor 32, Clark et al. col. 3, lines 39-42. As with the input capacitor 21, the current flow through this capacitor does not discharge through the laser diode. Also capacitor 30 is not a storage capacitor, since its voltage is initially zero, not 15 volts – note that both sides of the capacitor are initially charged to 15 volts. Thus the examiners statements on the bottom of page 4 are inaccurate.

With respect to claim 8, while the transistors 38 and 39 may be thought of as switches, the are "connected in a parallel fashion, with the source electrodes of both transistors being internally connected to their respective substrates and externally connected to ground, and the drain electrodes being connected together," Clark et al.,

col. 3, line 67 – col. 4, line 4. Since they are connected in parallel, they are connected to the laser diode in the identical way, not differently as are the switch limitations set forth in claim 8.

Generally, since independent claim 1 is not anticipated, all claims dependent from claim 1 also are not anticipated because they include all of the limitations of the claim 1 and are therefore patentable for at least the same reasons as is claim 1. Moreover, while the dependent claims may recite additional limitations of independent patentable significance, discussion of their independent patentability is moot in view of the remarks made in connection with the independent claims.

Conclusion

In view of the foregoing amendments and remarks, it is believed that the application is now in condition for allowance. Applicants respectfully request favorable reconsideration and the timely issuance of a Notice of Allowance. If a telephone conference would be helpful in resolving any issues concerning this communication, please contact the undersigned at (952) 253-4135.

Respectfully submitted,

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Date: August 21, 2006 By: _____
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